REMARKS

This communication is a full and timely response to the Office Action dated May 13, 2009. Claims 1-9 are pending. By this communication, claims 10 and 11 are canceled without prejudice or disclaimer to the underlying subject matter, and the specification and title of the invention are amended.

In the Office Action, the title and abstract are objected to for alleged informalities. Applicant respectfully traverses this rejection. However, in an effort to expedite prosecution the tile and abstract are amended to address the Examiner's concerns. Withdrawal of these objections is respectfully requested.

In numbered paragraph 4 claims 10 and 11 are objected to for alleged informalities and in numbered paragraph 5, claims 10 and 11 are rejected under 35 U.S.C. §101 for allegedly being directed to non-statutory subject matter. Because claims 10 and 11 are canceled without prejudice the aforementioned objection and rejection is rendered moot. Withdrawal, therefore, is respectfully requested.

Claims 1-11 are rejected under 35 U.S.C. §103(a) by *Mookerje et al* (U.S. Patent No. 7,180,443) in view of *Eid et al* (U.S. Patent No. 6,502,042). Applicant respectfully traverses this rejection.

As provided in Figs 1-5, exemplary methods are directed to the efficient decentralization of a particle filter. The method is achieved through a compact representation of a particle population. Each sensor node sends its tracks to neighboring nodes. The receiving node updates its own tracks using the new information in the incoming tracks before sending out its own tracks. The algorithm

requires that a local particle population be used to generate a Gaussian mixture approximation.

Applicant's claims broadly encompass the foregoing features. For example, claim 1 recites:

> A method for estimating a system state that is applied in a network comprising a plurality of nodes, each node having means for receiving and sending information and means for processing information, and each node being connected to selected other nodes of the network, the method comprising, at each node:
> (i)   maintaining a set of particles and associated weights, which represent an estimate of the system state,
> (ii)   representing the estimated system state as a mixture of Gaussian distributions, and communicating said mixture to neighbouring nodes, and
> (iii)   in response to receiving said mixture from a neighbouring node, updating the estimate of the system state that is maintained at the node.

Similarly independent claim 5 recites:

> A network for estimating a system state, the network comprising a plurality of nodes, each node having means for receiving and sending information and means for processing information, and each node being connected to selected other nodes of the network, each node including:
> particle filter means for maintaining a set of particles and associated weights, which represent an estimate of the system state, and means for updating the set when new *information* is available,
> means for representing the estimating system state as a mixture of Gaussian distributions, and means for communicating said mixture to neighbouring nodes,
> said means for updating, being responsive to receiving said mixture from a neighbouring node, for updating its estimate of the system state.

The combination of *Mookerjee* and *Eid* fails to disclose or suggest the features recited in claims 1 and 5 above.

Mookerjee discloses a system that estimates the states of a system having multidimensional parameters. The system uses a Kalman filters to explicitly include the physical bounds on uncertain parameters and separates a state estimation covariance into components attributable to measurement error and parameter

uncertainty and separately propagates these covariances from one time index k to next time index k+1, and based on these propagated covariances the gain matrix K are computed that weight the measurements to form the state estimates.

The Examiner appears to allege that the Kalman filters of *Mookerjee* are analogous to the particle filter architecture recited in Applicant's claims. However, one of ordinary skill would understand that a Kalman filter and a particle filter are two distinct estimation techniques such that a Kalman filter does not maintain a set of particles and associated weights as recited in independent claims 1 and 5. Moreover, the system of *Mookerjee* fails to include a feature of representing the estimated system state as a mixture of Gaussian distributions. While *Mookerjee* does disclose the use of a Gaussian distribution, this reference is silent with respect to a mixture of Gaussian distributions as recited in the claims.

The Examiner concedes that *Mookerjee* fails to disclose a plurality of nodes as recited in the claims, and relies on *Eid* in an effort to remedy this deficiency. *Eid* is directed to a fault tolerant liquid measurement system that includes a plurality of sensors for measuring parameters of a liquid in a container. *Eid* uses a neural network to process sensor measurement signals. As one of ordinary skill would understand neural networks require training and the neural network in its entirety processes the input sensor signals. As such, even if this reference were combinable with *Mookerjee*, the resulting system would not be capable of processing information at each node as recited in Applicant's claims.

In summary, *Mookerjee* and *Eid* when applied individually or in combination as alleged by the Examiner, fail to disclose or suggest every feature and/or the

combination of features recited in Applicant's claims. Accordingly, a *prima facie* case of obviousness has not been established.

The Office has the initial burden of establishing a **factual basis** to support the legal conclusion of obviousness. In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). For rejections under 35 U.S.C. § 103(a) based upon a combination of prior art elements, in KSR Int'l v. Teleflex Inc., 127 S.Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007), the Supreme Court stated that "a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art." "Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some **articulated reasoning with some rational underpinning** to support the legal conclusion of obviousness." In re Kahn, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) (emphasis added). For at least the foregoing reasons, withdrawal of this rejection is respectfully requested.

Conclusion

Based on the foregoing amendments and remarks, all objections and rejections raised by the Examiner have been addressed. As a result, Applicant submits that claims 1-9 are allowable and this application is in condition for allowance. In the event any unresolved issues remain, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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